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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/751,731	01/06/2004	Kyung-geun Lee	1793.1119	1493
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STEIN, MCEWEN & BUI, LLP 1400 EYE STREET, NW SUITE 300 WASHINGTON, DC 20005			EXAMINER ALUNKAL, THOMAS D	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/751,731	Applicant(s) LEE ET AL.	
	Examiner Thomas D. Alunkal	Art Unit 2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 August 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-10,13,15-17,19-21,23-31 and 33-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-10,13,15-17,19-21,23-31 and 33-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/28/07 has been entered.

Response to Arguments

Applicant's arguments filed 8/28/07 have been fully considered but they are not persuasive.

Regarding applicant's arguments beginning on page 8 and continuing on page 9 of Remarks, applicant argues that, "Yokoi fails to teach or suggest that the cooling pulses are bias power levels." The Examiner respectfully disagrees. Claim 17 requires that the low write power level is higher than a bias power level. The claims do not further specify a voltage level for the bias voltage. Thus, the claims require only that the low write power level is higher than a generic bias power level. Thus, pulse level C of Yokoi, Figure 7 reads on the bias voltage as recited in claim 17 because it is a voltage level which is lower than the low write power. Furthermore, the Examiner makes reference to Paragraph 0046 of applicant's specification which recites, "Referring to FIGS. 4B through 4D, in recording waveforms 1, 2, and 3 for the NRZI data, a recording pattern for recording a mark having a length of $7 T_w$ is formed of a recording multi-pulse

train, i.e., a first pulse, a multi-pulse train, and a **last pulse (or cooling pulse)**. Here, applicant's specification refers to the last pulse, which includes the bias voltage, as a cooling pulse. Thus, the Examiner believes that Yokoi does disclose the bias voltage element of claim 17.

On page 9 of Remarks, applicant also argues, "...the alleged low power Ar is still not a **last pulse** of the recording multi-pulse train, as recited in independent claim 17. Rather, Ar is a head heating pulse located at the **beginning** of the multi-pulse light-emission waveform." The Examiner concedes this argument. However, the argument provided by the applicant is not what is actually being claimed in claim 17. Claim 17 recites the limitation, "...and the low write power level of the multi-pulse train is set to be higher than the bias power level of the last pulse." The Examiner interprets this limitation as actually describing the last pulse being at the bias power level rather than last pulse being at the low write power level. More specifically, "...than the bias power level of the last pulse" describes the last pulse as being set to the bias power level. The Examiner suggests that the applicant reword this limitation of claim 17 to clearly describe the last pulse as being set to a low write power level and that the low write power level is set higher than a bias power level.

Regarding applicant's arguments for independent claims 21 and 31 on page 9 of Remarks, these arguments are rebutted for reasons similar to those for claim 17.

Regarding applicant's arguments for independent claim 1 on pages 10 and 11 of Remarks, applicant provides similar arguments as those provided for claim 17. Thus, arguments for claim 1 are rebutted for reasons similar to those provided for claim 17.

On pages 11 and 12 of Remarks, applicant argues that, "Minemura, however, fails to teach or suggest a low write power level being higher than a bias power level for a last pulse of the recording multi-pulse train, as recited in independent claims 21 and 31, upon which claims 26 and 33-36 depend." The Examiner renders this argument moot because Minemura was never relied upon as disclosing the recited features.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 17, 19-21, 23-25, 27-29, 31, 37, and 38 rejected under 35 U.S.C. 102(b) as being anticipated by Yokoi et al (hereafter Yokoi) (US 5,732,062).

Regarding claim 17, Yokoi discloses a method of recording data onto an optical recording medium (Column 11, lines 58-62 and Column 8, lines 38-40), the method comprising: generating a recording waveform having a recording pattern for high-speed recording (Column 4, lines 53-58 and Figure 7) and forming a first level of the data as a mark and a second level of the data as a space, using the generated recording waveform (Column 11, lines 65-67 and Figure 17, which displays the mark and subsequent unmarked space), wherein the recording pattern is formed of recording multi-pulse trains including a first pulse, a multi-pulse train and/or last pulse (Figure 7,

specifically, the multi-pulse light-emission waveform), wherein the multi-pulse train comprises a high write power level and a lower write power level (Figure 7, Elements Af and Ar), the first pulse comprises the high write power level and the low write power level of the multi-pulse train (Figure 7, Elements Af and Ar), the last pulse comprises the high write power level of the multi-pulse train and a bias power level (Figure 7, Elements Br and C (which corresponds to the bias power level)), and the low write power level of the multi-pulse train is set to be higher than the bias power level of the last pulse (Figure 7, Elements Af and C where Af is set to higher than C).

Regarding claim 19, Yokoi discloses wherein a power for an erasure pattern for data erasure has a predetermined DC level (Figure 7, Pulse level D).

Regarding claim 20, Yokoi discloses wherein a ratio of a time duration of the last pulse to a time duration of the multi-pulse train has a predetermined range with respect to a range of jitter allowable by a system (Column 8, lines 41-52, wherein the heating pulse corresponds the multi-pulse heating pulse of Figure 7).

Regarding claim 21, Yokoi discloses a method of recording data onto an optical recording medium (Column 11, lines 58-62 and Column 8, lines 38-40), the method comprising: generating a recording waveform having a recording and an erasure pattern with a multi-pulse train for high-speed recording (Column 4, lines 53-58 and Figure 7. Specifically, level D which corresponds to erasure) and forming a first level of the data as a mark and a second level of the data as a space, using the generated recording waveform (Column 11, lines 65-67 and Figure 17, which displays the mark and subsequent unmarked space), wherein the recording pattern is formed of recording

multi-pulse train including a first pulse, a multi-pulse train and/or last pulse (Figure 7, specifically, the multi-pulse light-emission waveform), wherein the multi-pulse train comprises a high write power level and a lower write power level (Figure 7, Elements Af and Ar), the first pulse comprises the high write power level and the low write power level of the multi-pulse train (Figure 7, Elements Af and Ar), the last pulse comprises the high write power level of the multi-pulse train and a bias power level (Figure 7, Elements Br and C (which corresponds to the bias power level)), and the low write power level of the multi-pulse train is set to be higher than the bias power level of the last pulse (Figure 7, Elements Af and C where Af is set to higher than C).

Regarding claim 23, Yokoi discloses wherein time periods of the recording multi-pulse train are controlled with respect to a timing window T_w within a range of $.25-2.0T_w$ (Column 8, lines 41-52, which shows that time periods fall within the range).

Regarding claim 24, Yokoi discloses wherein time periods of the recording multi-pulse train are equal to $1.0T_w$ (Column 8, lines 17-22. Specifically, each heating and cooling pulse is equal to the period T).

Regarding claim 25, Yokoi discloses wherein time periods of the recording multi-pulse train are equal to $2.0T_w$ (Column 5, lines 56-61. Specifically, mark lengths can range from 1,2,3,4,ect...).

Regarding claim 27, Yokoi discloses wherein a ratio of a time duration of the last pulse to a time duration of the multi-pulse train has a predetermined range with respect to a range of jitter allowable by a system (Column 8, lines 41-52, wherein the heating pulse corresponds the multi-pulse heating pulse of Figure 7).

Regarding claim 28, Yokoi discloses wherein a minimum cooling time duration of the last pulse depends on the range of jitter allowable by a system, and a maximum cooling time duration of the last pulse depends on a length of a minimum recorded mark (Column 7, lines 23-35. Specifically, the jitter is reduced with shorter cooling times, which is set to the shortest-length record mark size, to do so).

Regarding claim 29, Yokoi discloses wherein the cooling time duration of the last pulse of the recording pattern is set to the length of the minimum recorded mark (Column 8, lines 17-22).

Regarding claim 31, Yokoi discloses an apparatus for recording data onto an optical recording medium (Column 11, line 49), the apparatus comprising: a recording waveform generating circuit, which generates a recording waveform having a recording pattern for high-speed recording of the data (Column 11, lines 49-52 and Column 4, lines 53-58), and a pickup unit, which forms a mark or space by irradiating light onto the optical recording medium according to the generated recording waveform to record the data (Column 11, lines 60-63), wherein the recording pattern is formed of recording multi-pulse trains including a first pulse, a multi-pulse train and/or last pulse (Figure 7, specifically, the multi-pulse light-emission waveform), wherein the multi-pulse train comprises a high write power level and a lower write power level (Figure 7, Elements Af and Ar), the first pulse comprises the high write power level and the low write power level of the multi-pulse train (Figure 7, Elements Af and Ar), the last pulse comprises the high write power level of the multi-pulse train and a bias power level (Figure 7, Elements Br and C (which corresponds to the bias power level)), and the low write power level of

the multi-pulse train is set to be higher than the bias power level of the last pulse (Figure 7, Elements Af and C where Af is set to higher than C).

Regarding claim 37, Yokoi discloses wherein a power for an erasure pattern for data erasure has a predetermined DC level (Figure 7, Pulse level D).

Regarding claim 38, Yokoi discloses wherein a ratio of a time duration of the last pulse to a time duration of the multi-pulse train has a predetermined range with respect to a range of jitter allowable by a system (Column 8, lines 41-52, wherein the heating pulse corresponds the multi-pulse heating pulse of Figure 7).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3-10, 13, 15-16, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yokoi et al (hereafter Yokoi) (US 5,732,062) and in view of Furukawa et al. (hereafter Furukawa) (US 6,343,062).

Regarding claim 1, Yokoi discloses an optical recording medium (Column 11, lines 58-62) recording, erasing, and reproducing data (Column 8, lines 38-40), comprising a recording layer including power information for high-speed recording of a recording pattern for data recording is recorded (Figure 30A, Element 107a and Figure 7, specifically, the power of the various waveforms), wherein the power information

indicates that a recording pattern is formed of a recording multi-pulse train including a first pulse, a multi-pulse train and/or last pulse (Figure 7, specifically, the multi-pulse light-emission waveform), wherein the multi-pulse train comprises a high write power level and a lower write power level (Figure 7, Elements Af and Ar), the first pulse comprises the high write power level and the low write power level of the multi-pulse train (Figure 7, Elements Af and Ar), the last pulse comprises the high write power level of the multi-pulse train and a bias power level (Figure 7, Elements Br and C (which corresponds to the bias power level)), and the low write power level of the multi-pulse train is set to be higher than the bias power level of the last pulse (Figure 7, Elements Af and C where Af is set to higher than C). Yokoi does not disclose wherein the specific zone further contains additional recording information including power information. In the same field of endeavor, Furukawa discloses an optical disk for recording and reproducing high density signals which further has a control area, in which laser power information and beam modulation pattern information is stored (Figure 2, Element 61 and Column 13, lines 15-22).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to provide the control data area, containing power and modulation information, of Furukawa to the CD-ROM of Yokoi, motivation being to simplify the recording method of Yokoi wherein power control is read directly from the disc rather than an outside program or device, thereby increasing the access speed.

Regarding claim 3, Yokoi discloses wherein an erasure pattern formed of an erase multi-pulse train for data erasure is recorded (Column 12, lines 48-51), and the

power information indicates that the erase multi-pulse train has a high erase power level and a low erase power level and the low erase power level is set to be equal to a general erase power, and the high erase power level is set to be equal to the predetermined DC level (Figure 7, Pulse level D).

Regarding claim 4, Yokoi discloses wherein a ratio of a time duration of the last pulse to a time duration of the multi-pulse train has a predetermined range with respect to a range of jitter allowable by a system (Column 8, lines 41-52, wherein the heating pulse corresponds the multi-pulse heating pulse of Figure 7).

Regarding claim 5, Yokoi discloses wherein the ratio of the time duration of the last pulse to the time duration of the multi-pulse train ranges from 0.9-1.3 (Column 8, lines 53-56. Specifically, the ratio of the cooling pulse to the heating pulse is 1.2). Yokoi also discloses wherein the range of jitter allowable by the system is 7% (This being an inherent property of the ratio of the time duration of the last pulse to the time duration of the multi-pulse).

Regarding claim 6, this claim recites limitations similar to those in claim 5 and is rejected over the same grounds.

Regarding claim 7, Yokoi discloses wherein a minimum cooling time duration of the last pulse depends on the range of jitter allowable by a system, and a maximum cooling time duration of the last pulse depends on a length of a minimum recorded mark (Column 7, lines 23-35. Specifically, the jitter is reduced with shorter cooling times, which is set to the shortest-length record mark size, to do so).

Regarding claim 8, Yokoi discloses wherein the cooling time duration of the last pulse of the recording pattern is set to the length of the minimum recorded mark (Column 8, lines 17-22).

Regarding claim 9, 10, 13, and 15, these claims contain limitations similar to those in claims 1, 3, 4, 7, and 8 and are rejected over the same grounds.

Regarding claim 16, Yokoi discloses wherein power levels of a first pulse and a last pulse forming the erasure pattern are recorded as one of 4 types, including a first type where power levels of the first pulse and last pulse are equal to a high erase power level, a second type where the power level of the first pulse is equal to a low erase power level and the power level of the last pulse is equal to the high erase power level, a third type where the power level of the first pulse is equal to the high erase power level and the power level of the last pulse is equal to the low erase power level, and a fourth type where the power levels of the first pulse and last pulse are equal to the low erase power level (Figure 7, light-emission power level D where first and last pulse are at the same erasure power).

Regarding claim 30, Yokoi discloses the limitations of base claim 21 above but does not disclose the recording medium containing write power information about the generated recording waveform at a specific zone of a recording layer. In the same field of endeavor, Furukawa discloses an optical disk for recording and reproducing high density signals which further has a control area, in which laser power information and beam modulation pattern information is stored (Figure 2, Element 61 and Column 13, lines 15-22). Yokoi does not disclose wherein the data recorded on the disc further

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contains additional recording information including power information. In the same field of endeavor, Furukawa discloses an optical disk for recording and reproducing high density signals which further has a control area, in which laser power information and beam modulation pattern information is stored (Figure 2, Element 61 and Column 13, lines 15-22).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to provide the control data area, containing power and modulation information, of Furukawa to the CD-ROM of Yokoi, motivation being to simplify the recording method of Yokoi wherein power control is read directly from the disc rather than an outside program or device, thereby increasing the access speed.

Claims 26 and 33- 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yokoi et al (hereafter Yokoi) (US 5,732,062) and in view of Minemura et al (hereafter Minemura) (US 5,608,710).

Regarding claim 26, Yokoi does not disclose wherein power levels of the multi-pulse train constituting the erasure pattern periodically change between at least two levels, a high erasure power level P_{pe} and a low erase power level P_{be} . In the same field of endeavor, Minemura discloses a multi-pulse train which includes to erasure power levels, EH and EL.

One of ordinary skill in the art at the time of the applicant's invention would find it obvious to provide the modulation apparatus of Yokoi with the dual power levels of Minemura, motivation being to effectively reduce jitter in the system (Column 3, lines

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35-50 of Minemura). In addition, providing two erasure power levels account for the erasure differences between the marks and spaces, which could lead to degradation in the amount of rewrites on the optical disc.

Regarding claim 33, Minemura discloses wherein the recording waveform further comprises an erasure pattern formed of an erase multi-pulse train for data erasure (Figure 3), and the erasure multi-pulse train has a high erase power level (Figure 7, element EH) and a low erase power level (Figure 7, element EL) and a low erase power level is set equal to a predetermined DC level of a general erase power (Figure 4, level EH=EL and Column 4, line 12), a high erase power level is set to be equal to the predetermined DC level (Figure 4, level EH=EL and Column 4, line 12) or the predetermined DC level is set between the high erase power level and the low erase power level (Figure 3. Specifically a power level between EH and EL).

Regarding claim 34, Yokoi discloses wherein a ratio of a time duration of the last pulse to a time duration of the multi-pulse train has a predetermined range with respect to a range of jitter allowable by a system (Column 8, lines 41-52, wherein the heating pulse corresponds the multi-pulse heating pulse of Figure 7).

Regarding claim 35, Yokoi discloses wherein a minimum cooling time duration of the last pulse depends on the range of jitter allowable by a system, and a maximum cooling time duration of the last pulse depends on a length of a minimum recorded mark (Column 7, lines 23-35. Specifically, the jitter is reduced with shorter cooling times, which is set to the shortest-length record mark size, to do so).

Regarding claim 36, Yokoi discloses wherein the cooling time duration of the last pulse of the recording pattern is set to the length of the minimum recorded mark (Column 8, lines 17-22).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas D. Alunkal whose telephone number is (571)270-1127. The examiner can normally be reached on M-F 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on (571)272-7582. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Thomas Alunkal/
Examiner AU 2627

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